Charles Darwin University

Final Examination

Family Name						
Given Name/s						
Student Number						
Teaching Period	Semester 1, 2018					

ENV211 – Aquatic Ecology: Biota and Processes	DURATION	
	Reading Time:	10 minutes
	Writing Time:	180 minutes

INSTRUCTIONS TO CANDIDATES

Section A: Suggested Time: 60 mins	**Multiple Choice Questions**: Answer ALL 50 questions. 1 mark per question. (Total marks = 50)
Section B: Suggested Time: 50 mins	**Short Answer Questions**: Answer ALL 10 questions. 2 marks per question. (Total marks = 20)
Section C: Suggested Time: 70 mins	**Short Essay Questions:** Answer **EITHER Part A or Part B** of each of the 4 questions. 7.5 marks per question. (Total marks = 30)

EXAM CONDITIONS

You may begin writing from the commencement of the examination session. The reading time indicated above is provided as a guide only.
This is a CLOSED BOOK examination
No calculators are permitted
No handwritten notes are permitted
No dictionaries are permitted

ADDITIONAL AUTHORISED MATERIALS	EXAMINATION MATERIALS TO BE SUPPLIED
No additional printed material is permitted	1 x 16 Page Book 1 x 4-Multiple Choice Answer Sheet 1 x Scrap Paper

THIS EXAMINATION IS PRINTED DOUBLE-SIDED.

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK.

Section A

Section B
Short Answer Questions
Total No of Marks for this Section: 20

This section should be answered in the Answer Booklet provided.

Marks for each question are indicated. Suggested time allocation for Section B: 50 mins

---

Question 1

Fill in the blanks.

a) List the 4 temporal components of the flow regime

b) Define each component.

(Marks: 2)

Question 2

a) Describe the micro-habitats which might exist in an in-channel waterhole.
b) How are these micro-habitats likely to be affected by flow variability?

(Marks: 2)

Question 3

a) Define turbidity.
b) Describe the different factors which contribute to turbidity in natural waters.

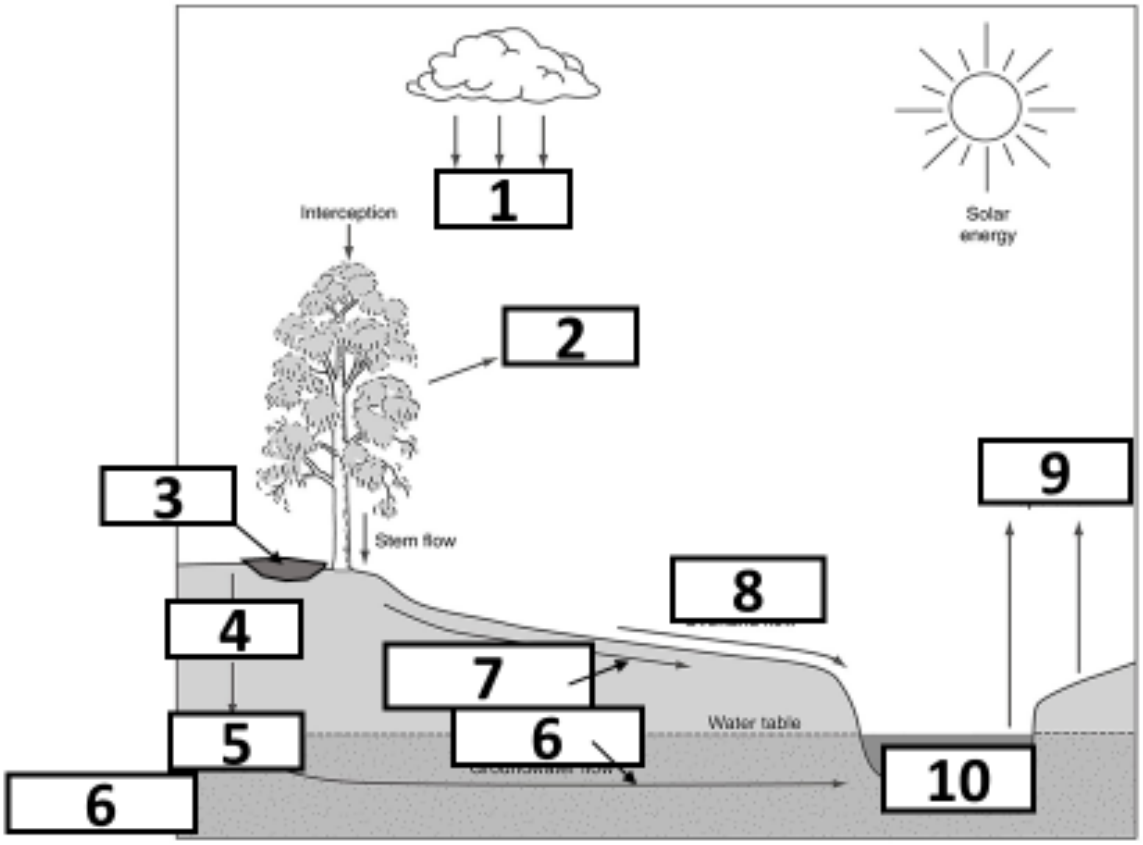
(Marks: 2)

Question 4

Fill in the blanks. In your answer book label the flowpaths, storages, inflows and outflows shown in the figure.

e.g.

1) XXXXX
2) XXXXX



(Marks: 2)

Question 5

Describe the ecological functions/role of flow and flow variability in aquatic ecosystems.

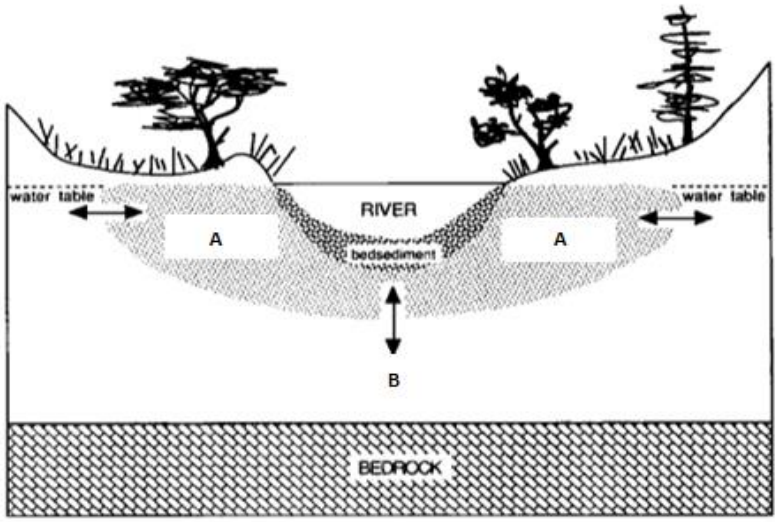
(Marks: 2)

Question 6

According to Ward (1998) 'Riverine landscapes: biodiversity patterns, disturbance regimes, and aquatic conservation' what is the highest and lowest level of the geomorphic hierarchy of riverine landscapes?

(Marks: 2)

Question 7



Adapted from Ward (1998)

Name the zones labelled as A and B in the figure above.

(Marks: 2)

Question 8

Explain what an autotroph and heterotroph are.

(Marks: 2)

Question 9

a) In lakes, the edge habitat is termed the "fringing zone". What is the term used for the zone with a similar function and location in a lotic system?
b) Describe at least one of the functions of those zones?

(Marks: 2)

Question 10

a) What is 'Water that is present in soils and geologic formations for sufficient time to undergo physical or chemical changes resulting from interactions with the aquifer environment.'?
b) And what aspects, or what perspective, does this definition integrate?

(Marks: 2)

Section C
Short Essay Questions
Total Number of Marks for this Section: 30

This section should be answered in the Answer Booklet provided.

Marks for each question are indicated. Suggested time allocation for Section C: 70 mins

---

Question 1

ANSWER ONE OF THE FOLLOWING:

EITHER

(A) The flow regime and connectivity are both key concepts in aquatic ecology.

- Discuss the relationship between the flow regime and connectivity in lotic systems (how does one effect the other?)
- Describe the implications of the above for aquatic biota
- Compare and contrast the temporal patterns of connectivity you would expect to see in a) the semi-arid/arid rivers of Australia's Murray-Darling Basin and the b) a perennial river in Tasmania.

(Marks: 7.5)

OR

(B) You are a researcher interested in how applicable the Flood Pulse concept is to different types of lotic ecosystems.

- Explain how you would go about testing this.
- In your answer you should describe the general process as well as the specific type of river system and species you would focus on and the type of data you would collect.

(Marks: 7.5)

Question 2

ANSWER ONE OF THE FOLLOWING:

EITHER

(A) The photo below shows a temporary lagoon or wetland in south-eastern Australia during drought.

- Describe the changes in physical and chemical features of water quality you would expect to occur in similar water bodies during the wetting-drying cycle.

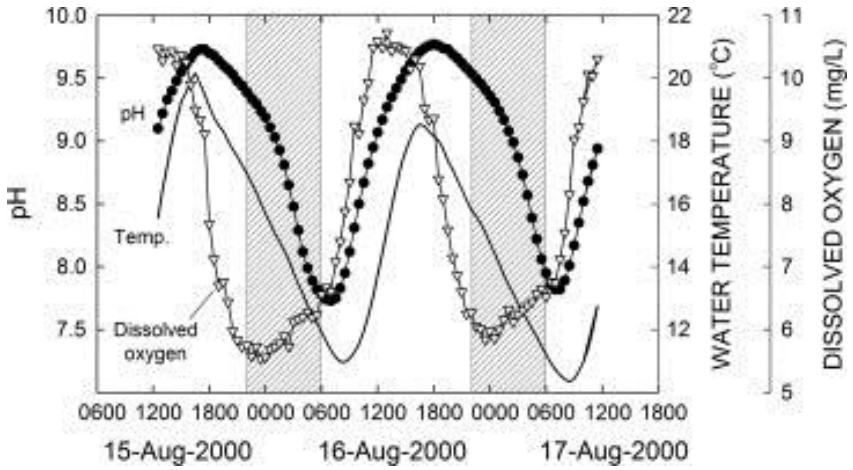
(Photo: Pittock 2009)

(Marks: 7.5)

OR

B) Examine the graph below. The graph plots water quality parameters (pH, temperature and dissolved oxygen) in a lentic system.

(Pittock 2009)



Gammons et al. (2001)

- Describe the biological and/or chemical processes which most likely produced the patterns you see in the graph. In your answer you should discuss the temporal variability of both the biological and/or chemical processes and the water quality parameters.

- How might the physical, chemical and/or biological features of different catchments influence the magnitude of pH fluctuations such as those shown in the graph?

(Marks: 7.5)

Question 3

ANSWER ONE OF THE FOLLOWING:

EITHER

(A) Draw an aquatic food web containing 4 trophic levels, label each trophic level (e.g. tertiary consumer) and give an example for each level of either a species or the functional feeding group (e.g. piscivore).

(Marks: 7.5)

OR

(B) What is a trophic cascade? (You can use a diagram to aid in your explanation)

(Marks: 7.5)

Question 4

ANSWER ONE OF THE FOLLOWING:

EITHER

(A) Describe the fate of a dead Eucalypt leaf that falls into a stream.

(Marks: 7.5)

OR

(B) From the paper by Amoros and Bornette (2002) 'Connectivity and biocomplexity in waterbodies of riverine floodplains', what are the four (4) dimensions of 'hydrological connectivity' and describe two of them.

(Marks: 7.5)